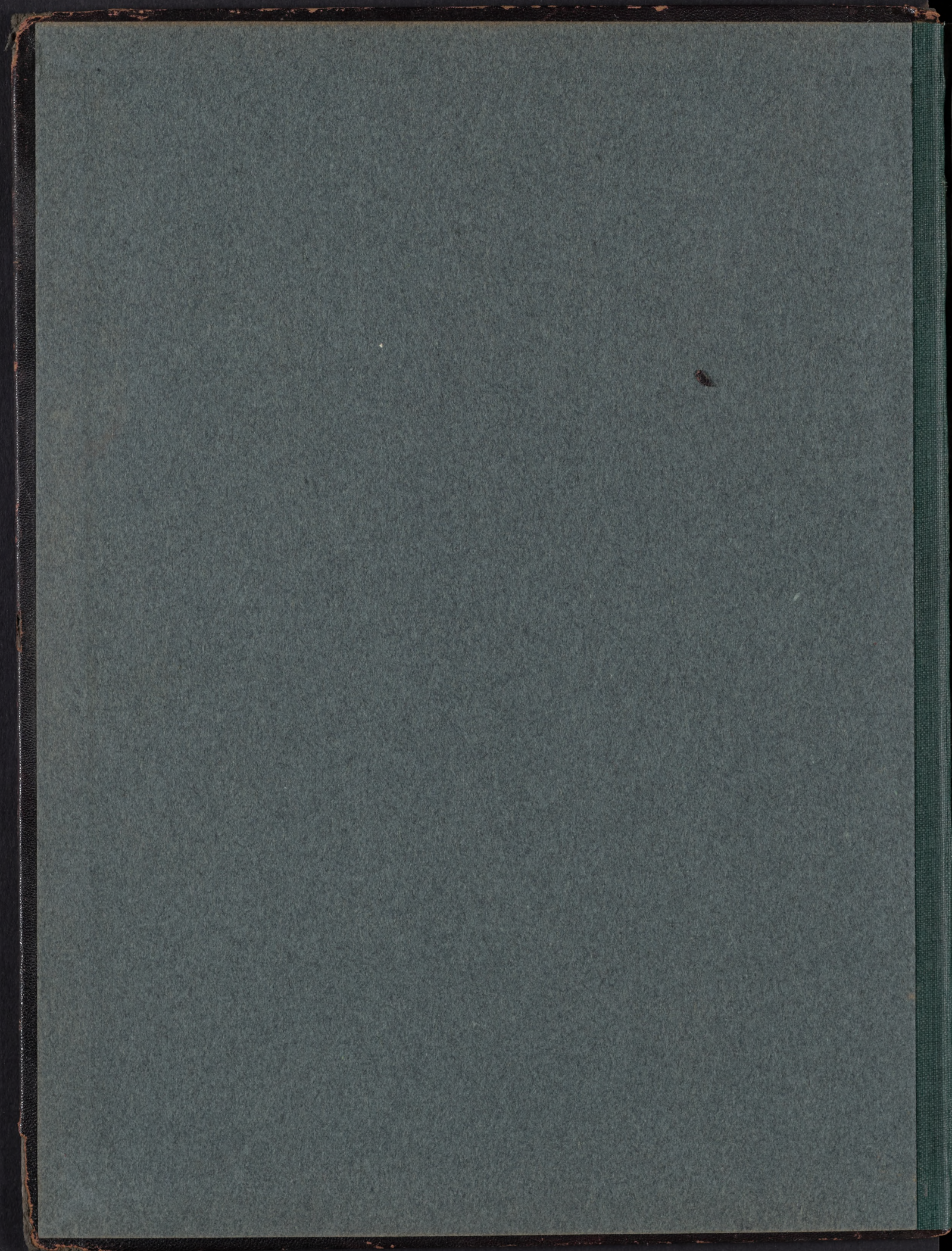
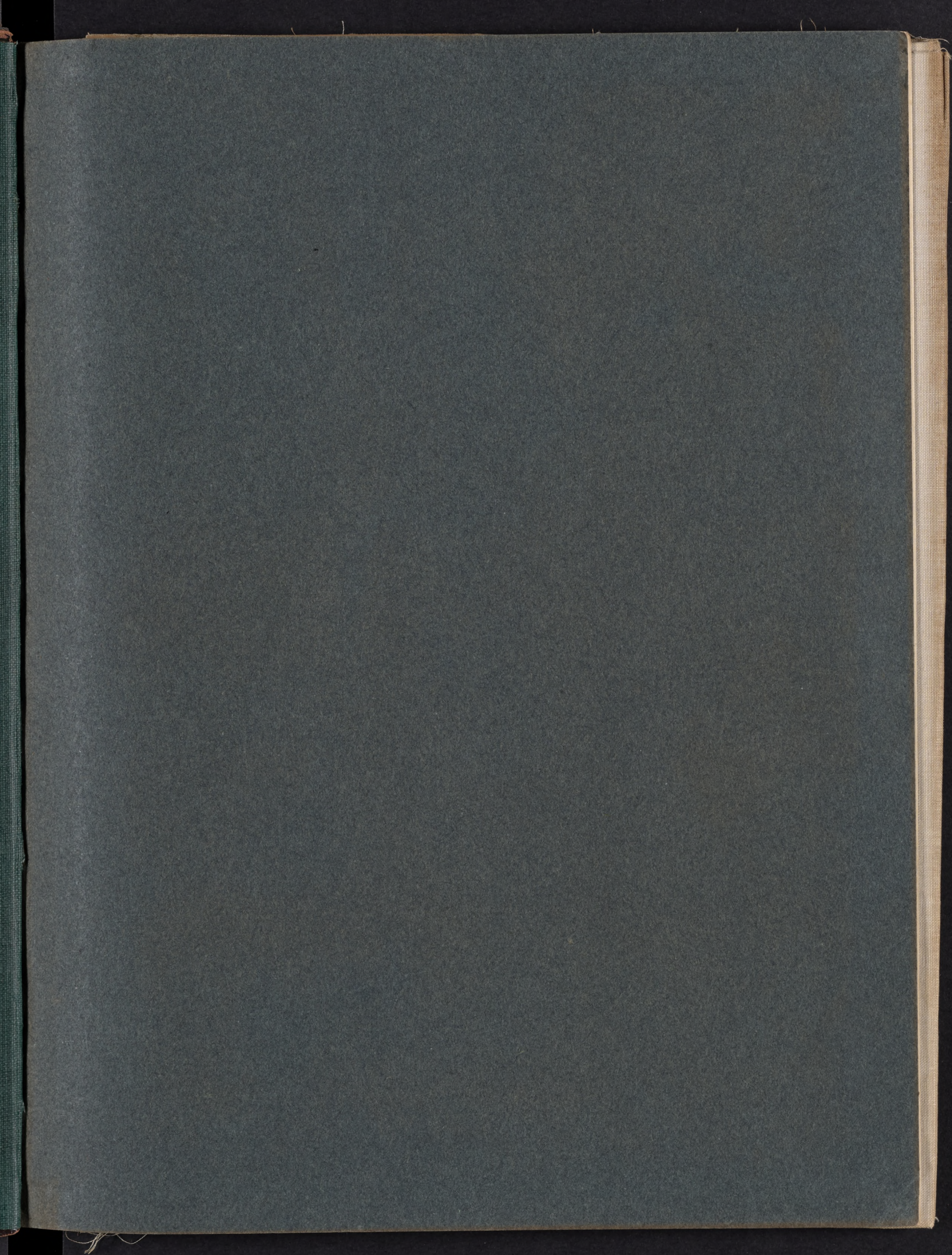
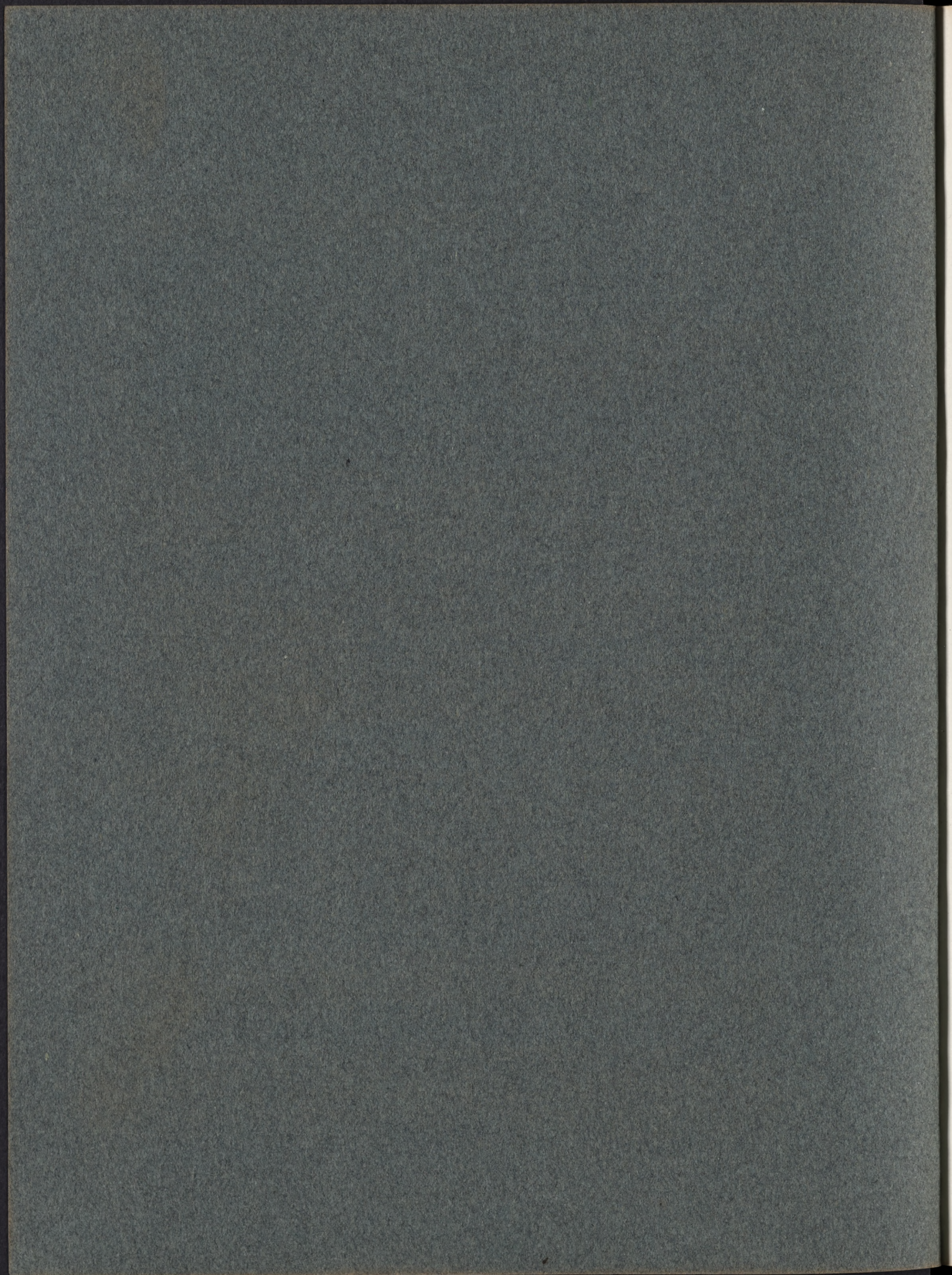


REPORT
TO
E. B. SHUGERT
ON THE
PROPOSED DEVELOPMENT
OF THE
WATER FRONT LAND
BELONGING TO
THE WESTERN MEAT COMPANY
AT
SOUTH SAN FRANCISCO, CAL.
BY
HOWARD C. HOLMES, CONSULTING ENGINEER
SAN FRANCISCO, CALIFORNIA
APRIL 1918







HOWARD C. HOLMES
CONSULTING ENGINEER
EXPERIENCED SUPERVISOR OF
CHIEF ENGINEER AND SURVEYOR
SANTA MARINA BUILDING
SAN FRANCISCO

San Francisco, Cal., April 20, 1918.

Mr. E. B. Shugert,
c/o Western Meat Company,
San Francisco,
California.

Dear Sir,

REPORT
TO

E. B. SHUGERT

ON THE

PROPOSED DEVELOPMENT

OF THE

WATER FRONT LAND

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THE WESTERN MEAT COMPANY

AT

SOUTH SAN FRANCISCO, CAL.

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SAN FRANCISCO, CAL.

APRIL, 1918.

the water front
50 feet in width
No. 5.

mixed earth, and
section shown in
later.

all along the water front
waterfront section
hills the water front
on Plans Nos. 1 and 2.

E. J. S. S. S. S.

W. J. S. S. S. S.

W. J. S. S. S. S.

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HOWARD C. HOLMES
CONSULTING ENGINEER
CHIEF ENGINEER S.F. DRY DOCK CO.
CHIEF ENGINEER S.F.O. & S.J. RY. CO.
SANTA MARINA BUILDING
SAN FRANCISCO

San Francisco, Cal., April 30, 1918.

Mr. E. B. Shugert,
C/o Western Meat Company,
San Francisco,
California.

Dear Sir:

In compliance with our correspondence during the month of February, in reference to the development of your Company's property at South San Francisco, I am submitting herewith a report and certain maps and plans, suggesting improvements along the lines referred to in said letters.

I propose first to outline the general scheme and then to take up in their regular sequence the suggestions made by you in your letter to me of February 18th. On the map which I have designated as No. 3, I have outlined a suggestion for a canal 300 feet in width between apron wharfs, beginning at a point 2000 feet inland from its existing western end, extending easterly for this width to the easterly edge of the marsh about 3,500 feet.

The channel then continues easterly in approximately its present course to the 20 foot low water contour. The portion beyond the water line to be 300 feet wide on the bottom, with side slopes of one foot in ten.

The portion of the canal extending through marsh, or the westerly 3500 feet, to have an apron wharf on either side 50 feet in width, as shown in accompanying cross-section, marked No. 5.

These said wharfs protect the slope of a broken stone, mixed earth, etc., retaining wall approximately of the cross section shown on plan No. 5, the details of which I will take up later.

It is also contemplated to build such an apron wharf all along the north side of canal as far east as the easterly waterfront established by the Tide Land Commission, and to also build the rip-rap retaining wall where necessary, all as shown on Plans Nos. 2 and 3.

San Francisco, Cal., April 30, 1918.

Mr. E. B. Shogert,
O. O. Western Meat Company,
San Francisco,
California.

Dear Sir:

In compliance with our correspondence during the month of February, in reference to the development of your Company's property at South San Francisco, I am submitting herewith a report and certain maps and plans, suggesting improvements along the lines referred to in said letters.

I propose first to outline the general scheme and then to take up in their regular sequence the suggestions made by you in your letter to me of February 19th. On the map which I have designated as No. 3, I have outlined a suggestion for a canal 300 feet in width between apron wharves, beginning at a point 3000 feet inland from the existing western end, extending easterly for a distance to the easterly edge of the marsh about 3,500 feet.

The channel then continues easterly in approximately its present course to the 30 foot low water contour. The portion beyond the water line to be 300 feet wide on the bottom, with side slopes of one foot in ten.

The portion of the canal extending through marsh, on the westerly 3500 feet, to have an apron wharf on either side 50 feet in width, as shown in accompanying cross-section, marked No. 5.

These said wharves protect the slope of a broken stone, mixed earth, etc., retaining wall approximately of the cross section shown on plan No. 6, the details of which I will take up later.

It is also contemplated to build upon an apron wharf all along the north side of canal as far east as the easterly waterfront established by the Tide Land Commission, and to also build the rip-rap retaining wall where necessary, all as shown on plans Nos. 2 and 3.

I have also shown a suggestion for improving the blind slough south of the present channel and adjacent to Belle Air Island. This would be in the manner suggested for the westerly extension of the present channel, viz., 300 ft. wide with apron wharf, and a depth of 20 ft. at low water.

I have also contemplated extending the apron wharfs and retaining walls along the present marsh lines and connecting the south apron wharf and retaining wall of the canal extension with the north wharf and wall of the Belle Air canal, all as shown on Plans Nos. 2 and 3.

You will notice that I have extended the apron wharf and retaining wall easterly from the south line of the Belle Air canal, along the southern boundary of the San Bruno canal. From all these apron wharfs it is proposed to run piers out into the San Bruno Turning Basin. These piers to be approximately 60 feet in width, and 400 feet in length, all as shown on Plans Nos. 2 and 3.

I have made a suggestion for a car ferry slip, and have provided, as you will see, for rail connections with the various wharfs, both with the Southern Pacific and the Belt Railroads.

Along the easterly shore line I have simply extended the water front to the line established by the State Tide Land Commission and have projected piers therefrom into the Bay proper, with suggestions for ship building and repairing plants, as indicated on Plan No. 3.

I have anticipated the development of the marsh and submerged lands and suggest the extension of the present outlet of the sewerage system to empty into the slough just south of Belle Air Island. In designing the various retaining walls shown on the plan, I had in mind the reclamation of marsh and tide lands behind the same.

The above is a general outline of the scheme which the writer thinks would be best adapted (considering the natural conditions that exist) for the reclamation and improvement of your property for dock and terminal purposes, and before going further into detail I will endeavor to take up in their regular order the suggestions made by you in your letter to me of February 18th.

First: A plan to provide 12 feet of water at mean low tide to take care of the industries already located and doing business throughout the present channel. We would like to have this considered as a permanent plan to provide lighterage and river boat service, without necessarily any reference to future deep water development.

I have also shown a suggestion for improving the blind along south of the present channel and adjacent to Belle Air Island. This would be in the manner suggested for the westerly extension of the present channel, viz., 300 ft. wide with apron wharf, and a depth of 20 ft. at low water.

I have also contemplated extending the apron wharfs and retaining walls along the present main lines and connecting the south apron wharf and retaining wall of the canal extension with the north wharf and wall of the Belle Air canal, all as shown on Plans Nos. 2 and 3.

You will notice that I have extended the apron wharf and retaining wall easterly from the south line of the Belle Air canal, along the southern boundary of the San Bruno canal. From all these apron wharfs it is proposed to run piers out into the San Bruno Turning Basin. These piers to be approximately 60 feet in width, and 400 feet in length, all as shown on Plans Nos. 2 and 3.

I have made a suggestion for a dry dock slip, and have provided, as you will see, for rail connections with the various wharves, both with the Southern Pacific and the Belle Air Railroad.

Along the easterly shore line I have simply extended the water front to the line established by the State Tide Land Commission and have projected piers therefrom into the bay proper, with suggestions for ship building and repairing plants, as indicated on Plan No. 3.

I have anticipated the development of the marsh and submerged lands and suggest the extension of the present outlet of the sewerage system to empty into the slough just south of Belle Air Island. In designing the various retaining walls shown on the plan, I had in mind the reclamation of marsh and tide lands behind the same.

The above is a general outline of the scheme which the writer thinks would be best adapted (considering the natural conditions that exist) for the reclamation and improvement of your property for dock and terminal purposes, and before going further into detail I will endeavor to send up in their regular order the suggestions made by you in your letter to me of February 18th.

First: A plan to provide 12 feet of water at mean low tide to take care of the industries already located and doing business throughout the present channel. We would like to have this considered as a permanent plan to provide lightering and river boat service, without necessarily any reference to future deep water development.

In answer to the above I refer you to my letter of the 26th of March, calling for a canal 150 feet wide with turning basin, etc., all as indicated by the red lines on Plan No. 1. In it I called for 14 feet of water rather than 12. I should add however, to that report, in order to make this canal of a permanent character, it would be necessary to provide for bulkhead or retaining wall on the north side where not at present built, and for some kind of a jetty along the south line to prevent silting and the encroachment of the mud from the south. This would mean additional expense over and above that mentioned in my estimate of March the 26th, about as follows: 7,000 feet of jetty at a cost of approximately \$50,000.00, all as shown in blue lines on the accompanying plan marked No. 1.

This at best however, could hardly be called of really a permanent nature, but as much so as would be warranted by the service given in the aforesaid canal.

As to your second suggestion you consider the first as the first unit in a plan of permanent development, I think I would suggest the question of the jetties extension on the south side be eliminated and the extension of the present canal 2,000 feet inland will be best answered further on in my report, when I take up the question of the detail of my general scheme as outlined.

Now, as to the question of utilizing the Schaw-Batcher Canal, I think I can convince you that the best way to reach that long narrow channel extending some 9,000 feet, mostly through the land owned exclusively by the Schaw-Batcher Company is, - to forget it.

First, for the reason that it will be impossible to reach said canal, except through a branch canal, which must necessarily be excavated through property not at present owned by your Company. The Schaw-Batcher canal is but 150 feet in width, with a depth of 15 feet at mean low water, and I am satisfied that the Schaw-Batcher people will have ample use for same, with their four launching ways and their large outfitting wharf.

For your Company to properly use this canal, it would involve the construction on your part of a wharf or landing place at or near Oyster Point, a turning basin at that point, and a branch canal from 1200 to 1500 feet in length, 150 feet in width and with a depth of 15 feet at low water. All of the above are outlined in red on Plan No. 1. This would involve an expenditure of at least from \$35,000 to \$40,000, all in addition to the cost of the extension of the Belt Railroad to that point, and the necessary streets and roads, and I fail to see what you would gain by any such outlay, and at the best, you would depend upon the Schaw-Batcher people to keep their canal open. I think the money could be spent to much better advantage in extending your present improvements.

In answer to the above I refer you to my letter of the 26th of March, calling for a canal 150 feet wide with turning basin, etc., all as indicated by the red lines on plan No. 1. In it I called for 14 feet of water rather than 12. I should add, however, to that report, in order to make this canal of a permanent character, it would be necessary to provide for bulwarks or retaining wall on the north side where not at present built, and for some kind of a jetty along the south line to prevent silting and the encroachment of the mud from the south. This would mean additional expense over and above that mentioned in my estimate of March the 26th, about as follows: 7,000 feet of jetty at a cost of approximately \$50,000.00, all as shown in blue lines on the accompanying plan marked No. 1.

This at best however, could hardly be called of really a permanent nature, but as much so as would be warranted by the service given in the proposed canal.

As to your second suggestion you consider the first as the first unit in a plan of permanent development, I think I would suggest the question of the jetty extension on the south side be eliminated and the extension of the present canal 2,000 feet inland will be best answered further on in my report, when I take up the question of the detail of my general scheme as outlined.

Now, as to the question of utilizing the Schaw-Batcher Canal, I think I can convince you that the best way to reach that long narrow channel extending some 2,000 feet, mostly through the land owned exclusively by the Schaw-Batcher Company is, - to

First, for the reason that it will be impossible to reach said canal, except through a branch canal, which must necessarily be excavated through property not at present owned by your Company. The Schaw-Batcher canal is but 150 feet in width, with a depth of 15 feet at mean low water, and I am satisfied that the Schaw-Batcher people will have ample use for same, with their four launching ways and their large outfitting wharf.

For your Company to properly use this canal, it would involve the construction on your part of a wharf or landing place at or near Quator Point, a turning basin at that point, and a branch canal from 1500 to 1500 feet in length, 150 feet in width and with a depth of 15 feet at low water. All of the above are outlined in red on plan No. 1. This would involve an expenditure of at least from \$35,000 to \$40,000, all in addition to the cost of the extension of the Belt Railroad to that point, and the necessary streets and roads, and I fail to see what you would gain by any such outlay, and at the best, you would depend upon the Schaw-Batcher people to keep their canal open. I think the money could be spent to much better advantage in extending your present improvements.

The question of bulkheads or retaining walls for ordinary dock mud of any excessive depth has been a problem which has always puzzled Engineers. This is evidenced by the large number of failures of these structures, and in the writer's experience there has never been anything in the nature of a pile or sheet piling, unless prohibitive in cost, which has been successful in restraining dredgings or mud fill, where the foundation was bottomless or excessively deep.

The only character of bulkhead in my opinion and experience which has been successful, is in the nature of restraining embankment of material heavier than the mud, such as broken rock, mixed earth, rock gravel, etc. This is particularly true when the depth of the dredging outside of the wall is in excess of 15 feet at mean low tide. Consequently, what I propose to use on the embankment along the lines of the channel and along the southerly edge of the San Bruno Basin is an embankment of the material mentioned, and all as shown on the cross section herewith submitted, marked No. 5.

As to the jetty which I would suggest using as a temporary retaining wall along the edge of the marsh, and as a restraining dike along the south edge of San Bruno channel, until such time as permanent improvements are made, I am submitting herewith a suggestion of a double row of staggered piles, connected together with a series of girts or wales of 6 x 8 lumber, running diagonally across the rows and called by the writer a mud fence, and shown on Plan marked No. 4.

The height of these piles extend about a foot above high water, and it is proposed when complete to use a clam shell dredger and to pile the mud over this so-called fence, to that height, to-wit: one foot above highwater.

As you are no doubt aware the surface of the soft dock mud rarely reaches above the line of low water, for the reason the action of wind and tide on the exposed surface of the mud tend to spread it.

The object of the mud fence is to form a core wall to retain the mud above its natural surface and allowing for a slope of one in ten either way, to prevent the influx of the mud south of the channel into the same.

The cost of these proposed improvements based on the present prices of materials and labor, would be about as follows:

Retaining wall, 32,000 lineal ft. @ \$25.00 per ft.	\$800,000.00
32,000 lineal feet of apron wharf @ \$30.00	
per lineal foot -----	960,000.00
32 wharfs or piers - 60 x 400 ft. each	
at \$15,000 each -----	480,000.00
Dredging covering all channels and in front of property out to the 20 ft. contour line, to a depth of 20 ft. at mean low water, 13,250,000 cubic yards, say at 7-1/2¢ per cubic yard, approximately -----	1,000,000.00
Making a total for all of these improvements of -	\$3,240,000.00

The question of bulkheads or retaining walls for ordinary dock and of any excessive depth has been a problem which has always puzzled Engineers. This is evidenced by the large number of failures of these structures, and in the writer's experience there has never been anything in the nature of a pile or sheet piling, unless prohibitive in cost, which has been successful in retaining dredge or mud fill, where the foundation was softness or excessive-ly deep.

The only character of bulkhead in my opinion and experience which has been successful, is in the nature of retaining embankment of material heavier than the mud, such as broken rock, mixed earth, rock gravel, etc. This is particularly true when the depth of the dredging outside of the wall is in excess of 15 feet at mean low tide. Consequently, what I propose to use on the embankment along the line of the channel and along the southerly edge of the San Bruno Basin is an embankment of the material mentioned, and all as shown on the cross section herewith submitted, marked No. 5.

As to the jetty which I would suggest using as a temporary retaining wall along the edge of the marsh, and as a retaining dike along the south edge of San Bruno channel, until such time as permanent improvements are made, I am submitting herewith a suggestion of a double row of staggered piles, connected together with a series of girts or walers of 6 x 8 lumber, running diagonally across the rows and called by the writer a mud fence, and shown on plan marked No. 4.

The height of these piles extend about a foot above high water, and it is proposed when complete to use a clam shell dredger and to pile the mud over this so-called fence, to that height, to-wit: one foot above highwater.

As you are no doubt aware the surface of the soft dock mud rarely reaches above the line of low water, for the reason the action of wind and tide on the exposed surface of the mud tends to spread it.

The object of the mud fence is to form a core wall to retain the mud above its natural surface and allowing for a slope of one in ten either way, to prevent the influx of the mud south of the channel into the same.

The cost of these proposed improvements based on the present prices of materials and labor, would be about as follows:

Retaining wall, 32,000 lineal ft. @ \$25.00 per ft.	\$800,000.00
32,000 lineal feet of apron skirt @ \$30.00	
per lineal foot	960,000.00
32 walers or piles - 60 x 600 ft. each	
at \$15,000 each	480,000.00
Dredging covering all channels and in front of property out to the 20 ft. contour line, to a depth of 20 ft. at mean low water,	
13,280,000 cubic yards, say at 7-1/2¢ per cubic yard, approximately	1,000,000.00
Making a total for all of these improvements of -	\$2,240,000.00

Dredging would about reclaim all of your submerged land but there would be an additional top filling covering the dredged material which could be obtained from Belle Air Island and other portions of the highland and would amount to approximately 2,000,000 cubic yards, which would cost approximately \$800,000.00, and it is safe to say that all of these improvements carried out on the contemplated scheme, as shown on Plan No. 2, would cost not to exceed four and one half million dollars.

Now the work could be carried along these lines of improvement to accomodate the present use of channel, and what will be needed in the very near future, and I would suggest as the first unit, the following:

First: The dredging of the channel, for its entire length to a width of 150 feet, with a depth of 14 feet at low water. See outline in red on Plan No. 1. In that case I would suggest that you build the pile jetty or dike along the south side of San Bruno Channel; also shown in dotted red line on Plans Nos. 1 and 2. This would cost about \$30,000.00, and, adding to this the cost of some twenty, three pile dolphins to mark the channel, together with the dredging, should not exceed a total cost of \$70,000.00.

Now, if the channel were extended 2,000 feet west, I would suggest that the north side of this extension be protected with a rock fill bulkhead and the apron wharf, and that the dike retaining wall or mud fence be extended along the south side or marshland, - see blue lines, Plan No. 1. This would involve an additional expense as follows:

2400 feet of retaining wall and wharf	\$109,000.00
3500 lin. ft. of dike on the south side	25,000.00
Additional dredging 200,000 cubic yds.	16,000.00
Or a total additional cost of	<u>\$150,000.00</u>

Making a grand total of -----	\$220,000.00
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In order to retain the dredging it would pay to carry the before mentioned dike along the easterly edge of the marsh, on the south side of the channel. This would cost approximately \$30,000.00.

All of the above would give you as follows:

A Channel 150 feet in width, 14 feet at low water, with a slope of one to ten at the south side and on both sides beyond the main land, all extending from a point 2,000 feet west of its westerly end to the 14 ft. contour, having an apron wharf and retaining wall on the north side of this westerly extension, a dike along the south side for the same distance and a dike along the easterly boundary of the marsh to retain the dredgings, and also one along

Dredging would about reclaim all of your submerged land but there would be an additional top filling covering the dredged material which could be obtained from Bolle Air Island and other portions of the highland and would amount to approximately 2,000,000 cubic yards, which would cost approximately \$800,000.00, and it is safe to say that all of these improvements carried out on the contemplated scheme, as shown on Plan No. 2, would cost not to exceed four and one half million dollars.

Now the work could be carried along these lines of improvement to accommodate the present use of channel, and what will be needed in the very near future, and I would suggest as the first unit, the following:

First: The dredging of the channel, for its entire length to a width of 150 feet, with a depth of 14 feet at low water. See outline in red on Plan No. 1. In that case I would suggest that you build the pile jetty or dike along the south side of San Bruno Channel; also shown in dotted red line on Plans Nos. 1 and 2. This would cost about \$30,000.00, and, adding to this the cost of some twenty, three pile dolphins to mark the channel, together with the dredging, should not exceed a total cost of \$70,000.00.

Now, if the channel were extended 2,000 feet west, I would suggest that the north side of this extension be protected with a rock fill bulwark and the apron wharf, and that the dike retaining wall on and fence be extended along the south side on mainland. See blue lines, Plan No. 1. This would involve an additional expense as follows:

\$200,000.00	2500 feet of retaining wall and wharf
\$8,000.00	\$200 lin. ft. of dike on the south side
\$10,000.00	Additional dredging 200,000 cubic yds.
\$290,000.00	Or a total additional cost of
\$230,000.00	Making a grand total of

In order to retain the dredging it would pay to carry the before mentioned dike along the easterly edge of the marsh, on the south side of the channel. This would cost approximately \$80,000.00.

All of the above would give you as follows:

A channel 150 feet in width, 14 feet at low water, with a slope of one to ten at the south side and on both sides beyond the main land, all extending from a point 2,000 feet west of the western end to the 14th contour, having an apron wharf and retaining wall on the north side of this westerly extension, a dike along the south side for the same distance and a dike along the easterly boundary of the marsh to retain the dredging, and also one along

the southerly boundary line of the San Bruno Channel to prevent the encroachment of the mud from the south side, together with a turning basin in San Bruno Channel, 400 feet by 600 feet. Also having a depth of 14 feet at mean low tide,- all as outlined in red and blue on Plan No. 1. All as above stated at an approximate cost of \$250,000.00.

As regards the letter to me from the General Manager of your Land & Improvement Company, Mr. W. J. Martin, relative to the feasibility of a proposition for a Dock and Terminal Company, having in view the reclamation of some of the swamp and overflowed land, at a cost which is not prohibitive, I have this to suggest:

First: I would dredge the channel for its entire length, that is, from a point 2,000 feet west of its present westerly terminus to the 20 ft. low water contour.

Second: Construct the bulkhead and apron wharf on the north side of channel from its proposed western end to the westerly boundary of the Terra-Cotta Company's property. Also across the westerly end and along the south side of channel for 2,000 feet.

Third: I would build the dike along the easterly shore of the marsh land and across the blind slough. Also the dike along the southerly boundary of the San Bruno Canal, all as shown on Maps Nos. 1 and 2 in red and blue.

Fourth: To fill that portion of the marsh and tide land bounded by the channel on the north, the blind slough on the south, the east and west boundary being the upland and the proposed dike along the eastern edge of marsh, to 6 feet above mean high water mark. This would require some 3,300,000 cubic yards of mud. Of this 600,000 would come from the channel proper and the balance could be dredged from the San Bruno Basin, from the north portion thereof, leaving a turning basin of some magnitude until such time as the entire San Bruno Basin were completed.

Fifth: I would suggest that the mud fill in the reclaimed portion of the marsh land be covered with a topping 18 inches in thickness, of such material as could be obtained from Belle Air Island or the adjacent upland. This would require some 800,000 cubic yards.

The cost of these suggested improvements would be about as follows:

6,500 ft. of apron wharf and bulkhead -----	\$357,500.00
8,500 ft. of dike along marsh and south line of San Bruno Channel -----	60,000.00
3,300,000 cubic yards of dredging at 7¢ -----	231,000.00
800,000 cubic yards of top filling at 40¢ ---	320,000.00
	<u>\$968,500.00</u>
Contingents, overhead, etc., 20% -----	193,700.00
	<u>1,162,200.00</u>

the southerly boundary line of the San Bruno Channel to prevent the encroachment of the marsh from the north side, together with a turning basin in San Bruno Channel, 400 feet by 200 feet. Also having a depth of 14 feet at mean low tide, all as outlined in red and blue on Plan No. 1. All as above stated at an approximate cost of \$280,000.00.

As regards the letter to me from the General Manager of your land & improvement company, Mr. W. J. Martin, relative to the feasibility of a proposition for a Dock and Terminal Company, having in view the restoration of some of the swamp and overflowed land, at a cost which is not prohibitive, I have this to suggest:

First: I would dredge the channel for its entire length, that is, from a point 2,000 feet west of its present westerly terminus to the 50 ft. low water contour.

Second: Construct the bulkhead and apron wharf on the north side of channel from its proposed western end to the westerly boundary of the Terra-Cotta Company's property. Also across the westerly end and along the north side of channel for 2,000 feet.

Third: I would build the dike along the easterly shore of the marsh and across the blind slope. Also the dike along the southerly boundary of the San Bruno Canal, all as shown on Plans Nos. 1 and 2 in red and blue.

Fourth: To fill that portion of the marsh and tide land bounded by the channel on the north, the blind slope on the north, the east and west boundaries being the wharf and the proposed dike along the eastern edge of marsh, to a feet above mean high water mark. This would require some \$2,800,000 cubic yards of mud. Of this 600,000 would come from the channel proper and the balance could be dredged from the San Bruno Basin, from the north portion thereof, leaving a turning basin of some magnitude until such time as the entire San Bruno Basin were completed.

Fifth: I would suggest that the mud fill in the reclaimed portion of the marsh land be covered with a topsoil 18 inches in thickness, of such material as could be obtained from Bailey Air Island or the adjacent upland. This would require some 800,000 cubic yards.

The cost of these suggested improvements would be about as follows:

2,800,000	cost of San Bruno Channel
2,000,000	cost of dredging at 4 ft
800,000	cost of top filling at 4 ft
1,182,200.00	Contingents, overhead, etc., 50%
6,682,200.00	cost of apron wharf and bulkhead
60,000.00	cost of dike along marsh and south
281,000.00	cost of San Bruno Channel
1,182,200.00	cost of dredging at 4 ft
800,000.00	cost of top filling at 4 ft
1,182,200.00	Contingents, overhead, etc., 50%
1,182,200.00	

RECAPITULATION

The total cost of all the improvements shown on Plan No. 3 are as follows:

32,000 lineal feet of retaining wall and apron wharf -----	\$1,760,000.00
32 piers or wharfs, 60 feet in width and 400 feet in length -----	480,000.00
All the dredging required to give a depth at all structures of 20 ft. at mean low water and to fill the adjacent marsh and submerged land -----	1,000,000.00
Topping all of the filled land with material from the adjacent highlands -----	<u>1,200,000.00</u>
Making a total of -----	4,440,000.00

A channel 150 feet in width, 14 feet at low water, with slopes of one to ten, commencing at a point 2,000 feet west of the westerly terminus of the present canal, and to have apron wharf and bulkhead on the westerly extension on the north side and a dike along the south side for the same distance. Also a dike along the eastern boundary of the marsh to retain the dredging, and one along the southern boundary of San Bruno Channel to prevent encroachment of the marsh from the south side, together with a turning basin in San Bruno channel 400 x 600 feet;- all as outlined in red and blue on Plan No. 1, for the cost of \$250,000.00,- made up as follows:

First Unit:

Dredging -----	\$40,000.00	
Jetties or dikes -----	<u>30,000.00</u>	\$70,000.00

Second Unit:

Channel 2,000 feet longer, with apron wharf and bulkhead across end, making 2400 ft. of wharf and bulkhead -----	108,000.00	
3500 lineal ft. of dike on south side -----	26,000.00	
Additional dredging -----	<u>16,000.00</u>	150,000.00

Third Unit:

Retaining wall for dredging along easterly edge of marsh on south side of channel ---	<u>30,000.00</u>	<u>30,000.00</u>
Making a total of -----		\$250,000.00

RECAPITULATION

The total cost of all the improvements shown on Plan No. 3 are as follows:

32,000 linear feet of retaining wall and	
apron wharf	\$1,760,000.00
32 piers or wharfs, 60 feet in width and	
400 feet in length	280,000.00
All the dredging required to give a depth	
at all entrances of 20 ft. at mean	
low water and to fill the adjacent marsh	
and submerged land	1,000,000.00
Topping all of the filled land with water-	
in from the adjacent highlands	1,200,000.00
Making a total of	\$4,440,000.00

A channel 150 feet in width, 14 feet at low water, with slopes of one to ten, commencing at a point 2,000 feet west of the westerly terminus of the present canal, and to have apron wharf and bulkhead on the westerly extension on the north side and a dike along the south side for the same distance. Also a dike along the eastern boundary of the marsh to retain the dredging, and one along the southern boundary of San Bruno Channel to prevent encroachment of the marsh from the south side, together with a turning basin in San Bruno channel 600 x 600 feet; all as outlined in red and blue on plan No. 1, for the cost of \$280,000.00, made up as follows:

First Unit:

Dredging	\$40,000.00
Dikes or dikes	30,000.00
	\$70,000.00

Second Unit:

Channel 2,000 feet longer, with	
apron wharf and bulkhead apron	
and, making 2400 ft. of wharf	
and bulkhead	108,000.00
3500 linear ft. of dike on north	
side	28,000.00
Additional dredging	16,000.00
	150,000.00

Third Unit:

Retaining wall for dredging	
along easterly edge of marsh	
on south side of channel	30,000.00
Making a total of	\$280,000.00

All of the above quantities and prices have been obtained from actual survey and from conservative prices given by contractors of experience in this line of work.

It was the intention of the writer in estimating the cost of the fill for bulkhead purposes to obtain the same from the adjacent highlands and to excavate by means of a steam shovel, and to transport by means of automobile trucks, having recently had considerable experience in this method, in constructing the dry dock at Hunter's Point. I am satisfied that my estimates are all conservative and the only chance for variation would be in the estimated quantity of rock necessary for bulkhead purposes. This at all times is uncertain and unsatisfactory, but as I said before, I am satisfied that my estimates are conservative.

All of which is respectfully submitted.

Howard C. Holmes

Consulting Engineer.

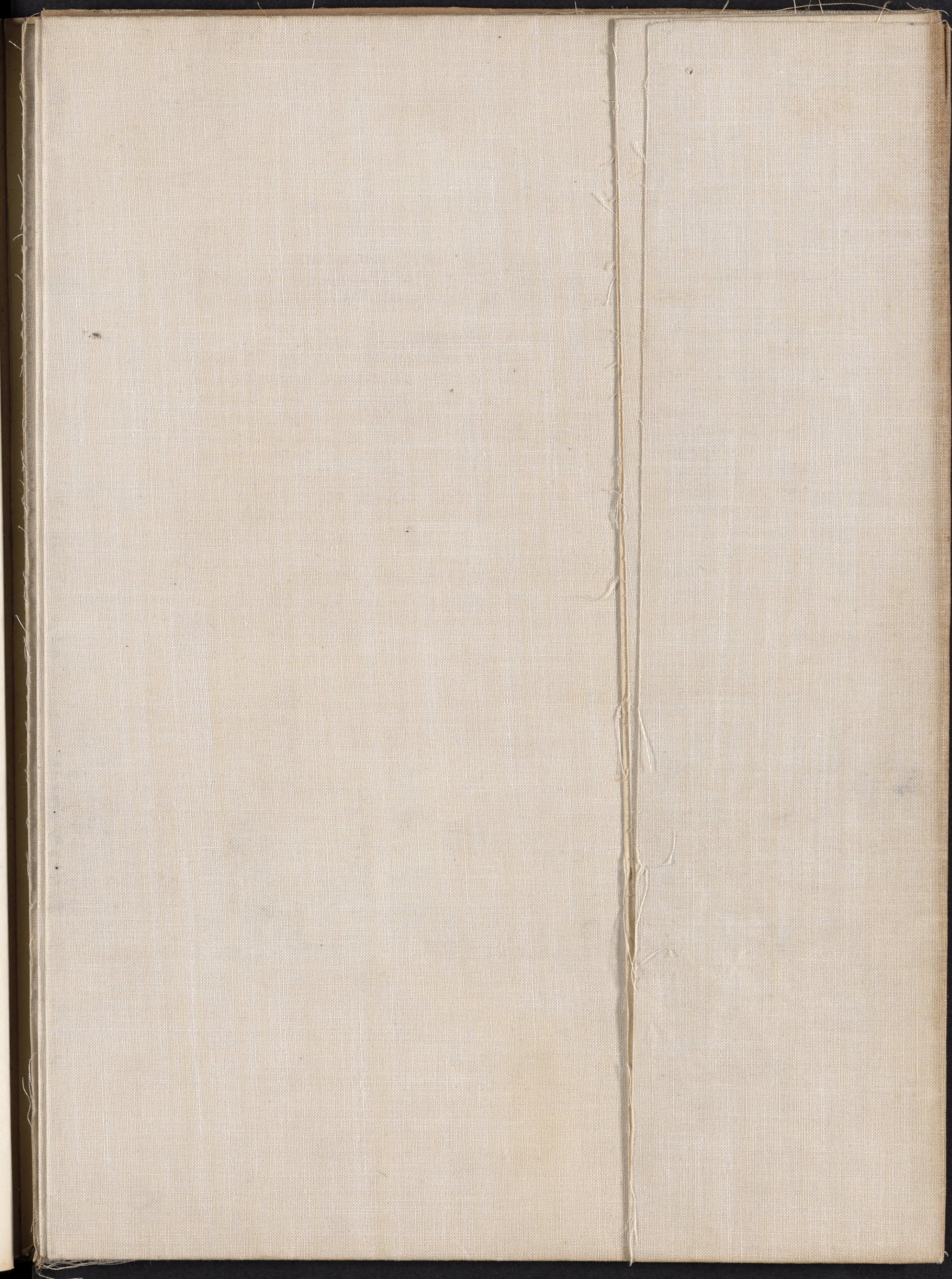
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All of which is respectfully submitted.

Thomas J. H. H. H.

Consulting Engineer.

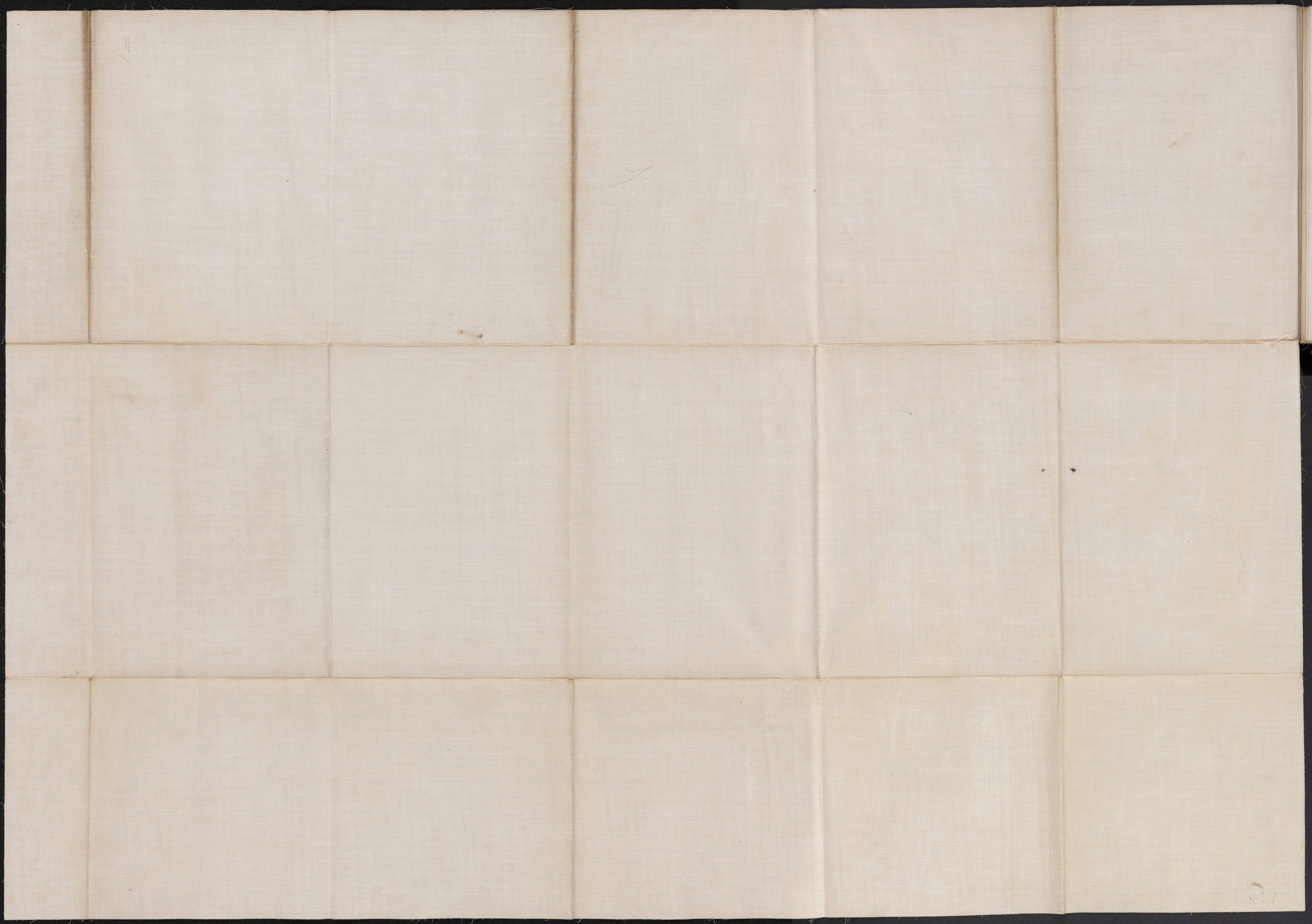


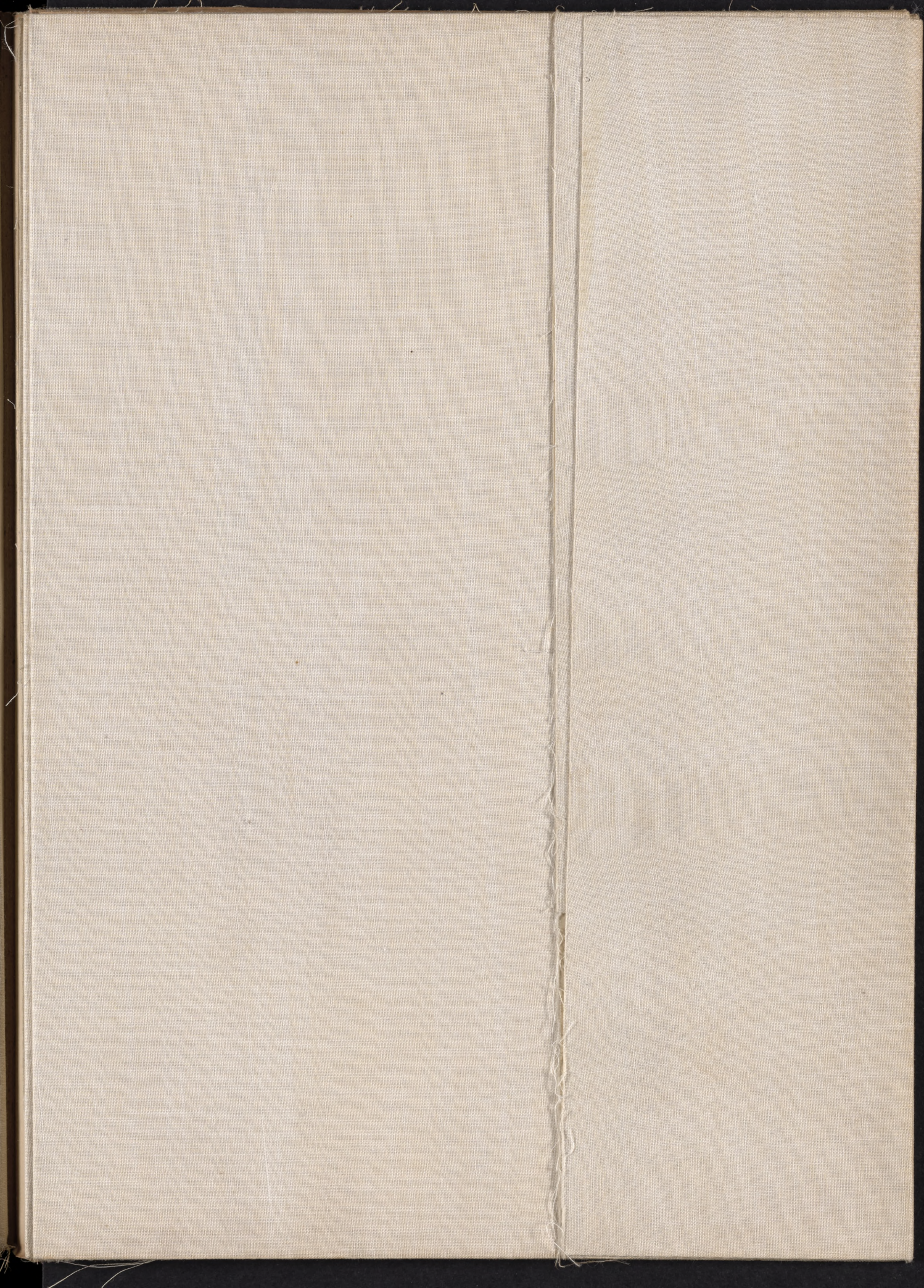
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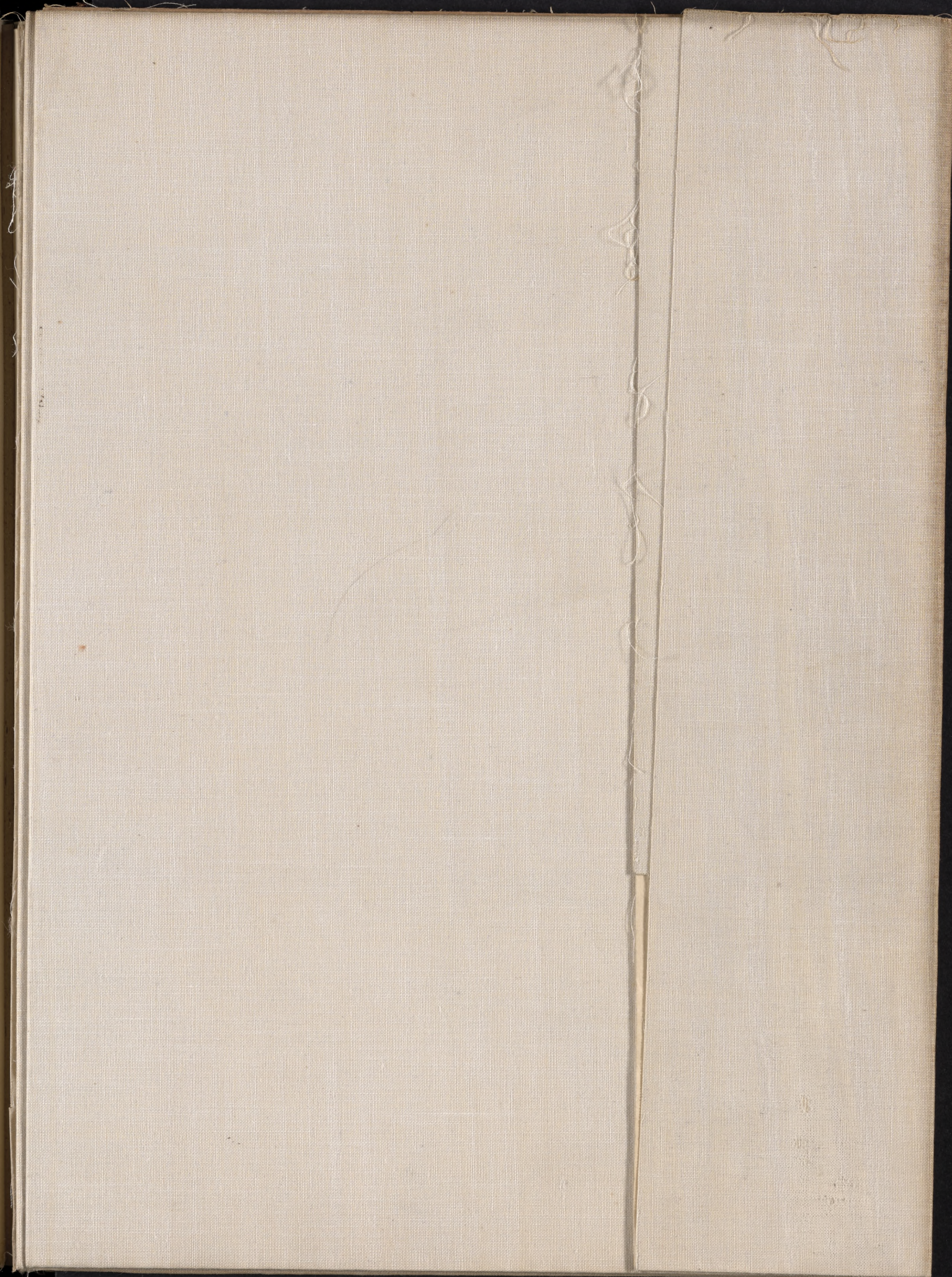
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SOUTH SAN FRANCISCO
OF
SAN MATEO COUNTY
CALIFORNIA
ACCOMPANYING REPORT OF
HOWARD C. HOLMES, CONSULTING ENGINEER
TO
E.B. SHUGERT
OF THE
WESTERN MEAT CO.
APRIL 1918

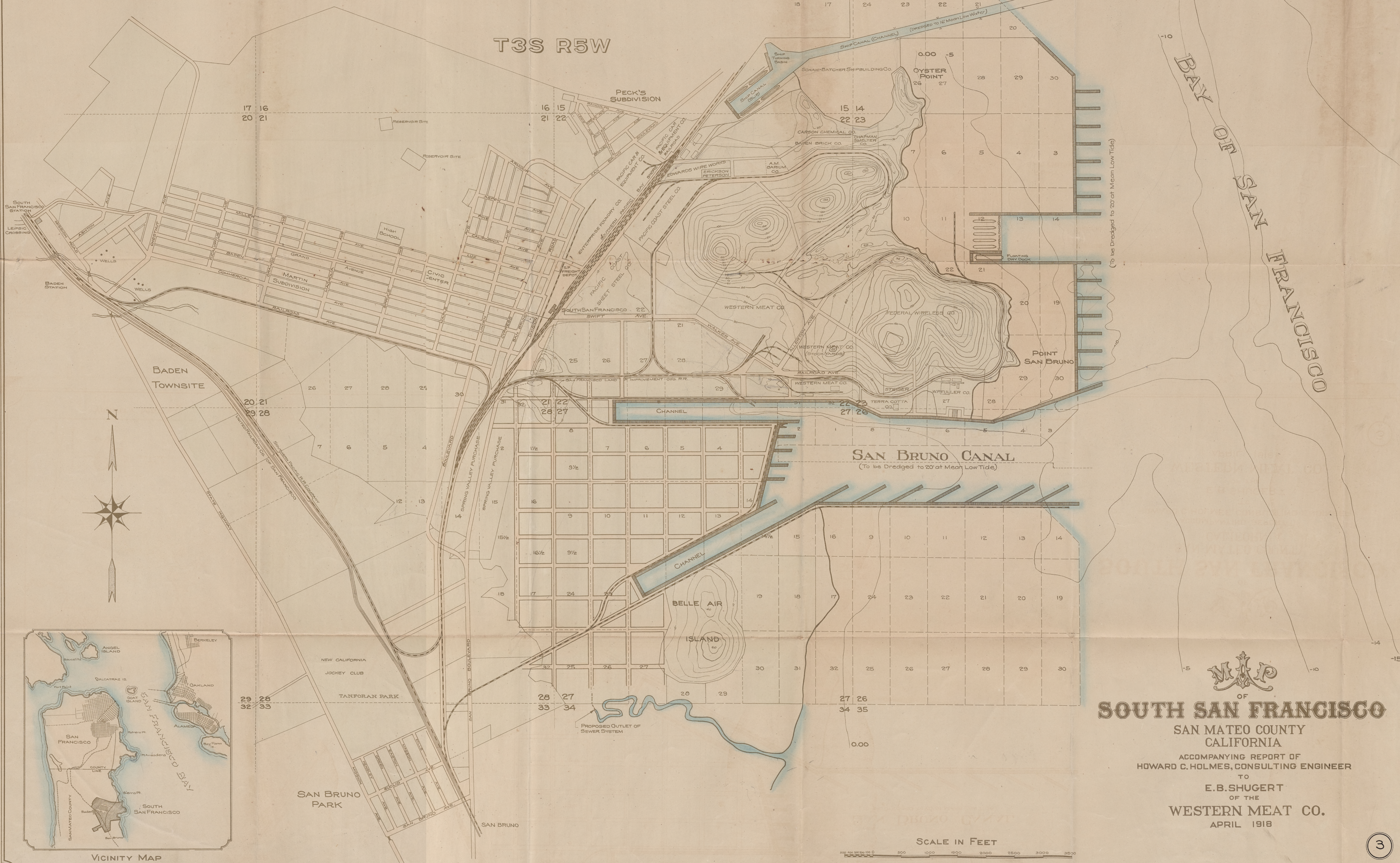






CANADA DE GUADALUPE LA VISITACION Y RODEO VIEJO

T3S R5W



SOUTH SAN FRANCISCO

SAN MATEO COUNTY
CALIFORNIA

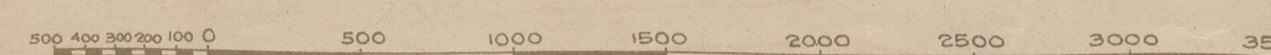
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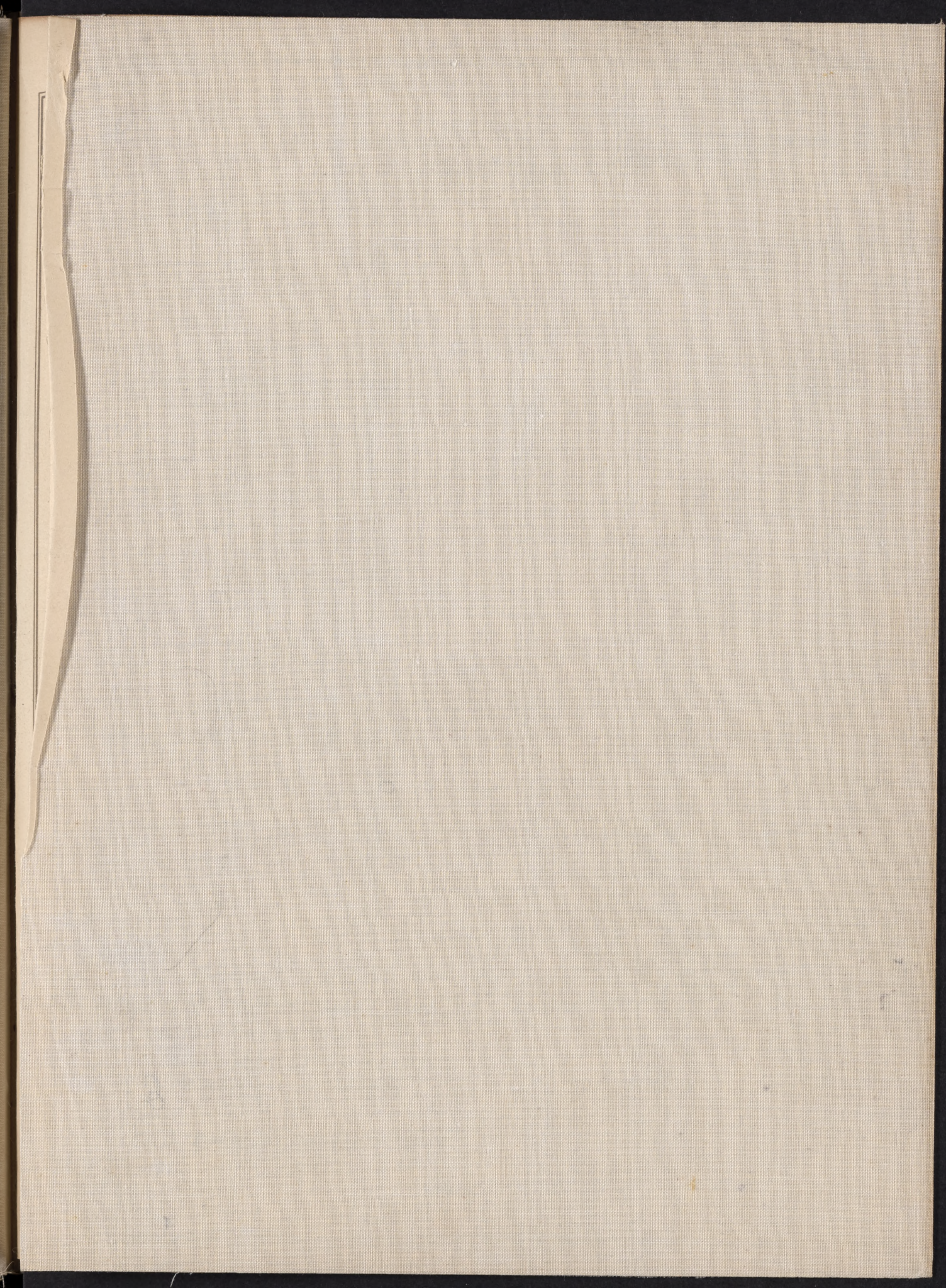
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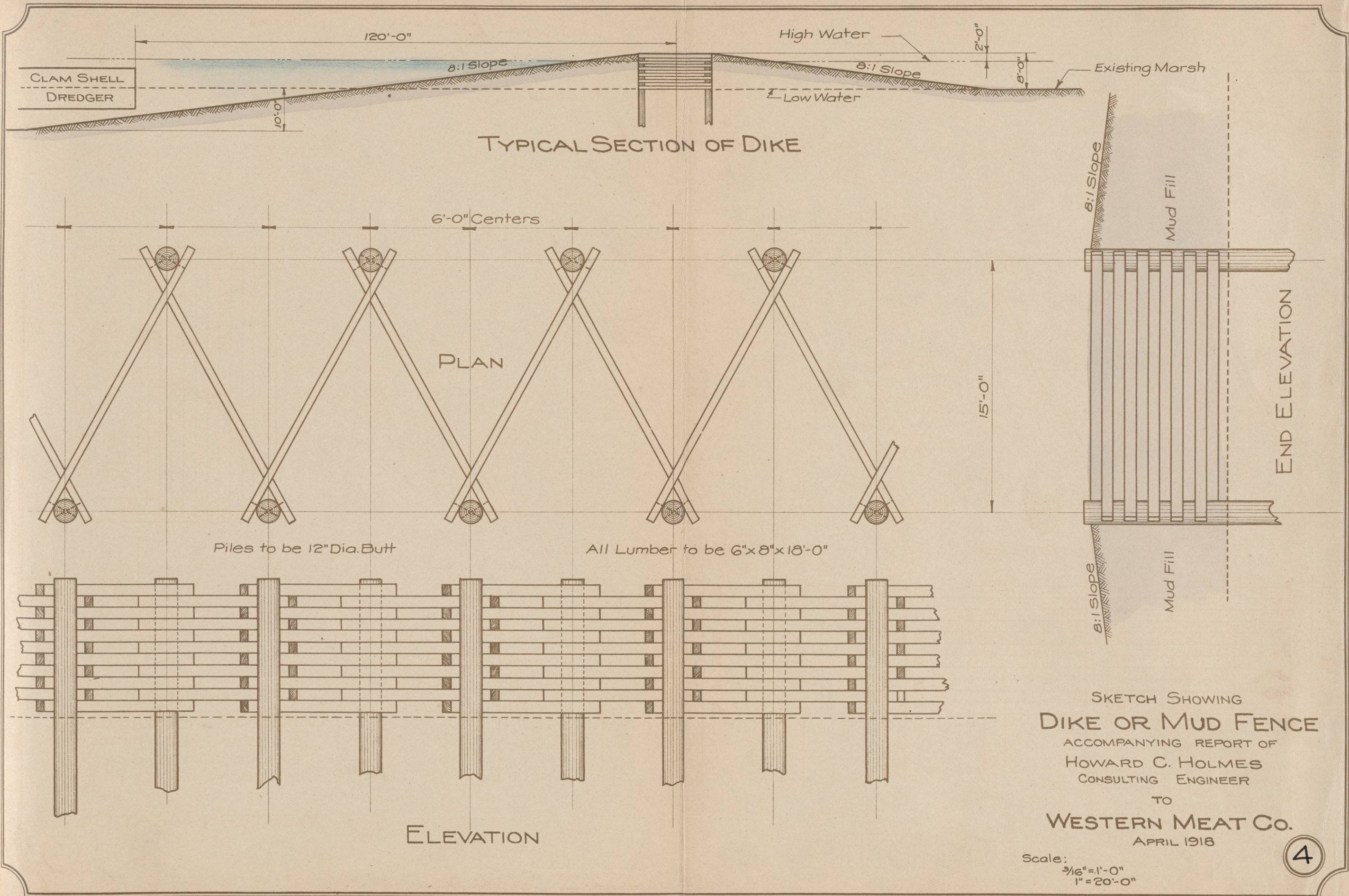
WESTERN MEAT CO.

APRIL 1918

SCALE IN FEET

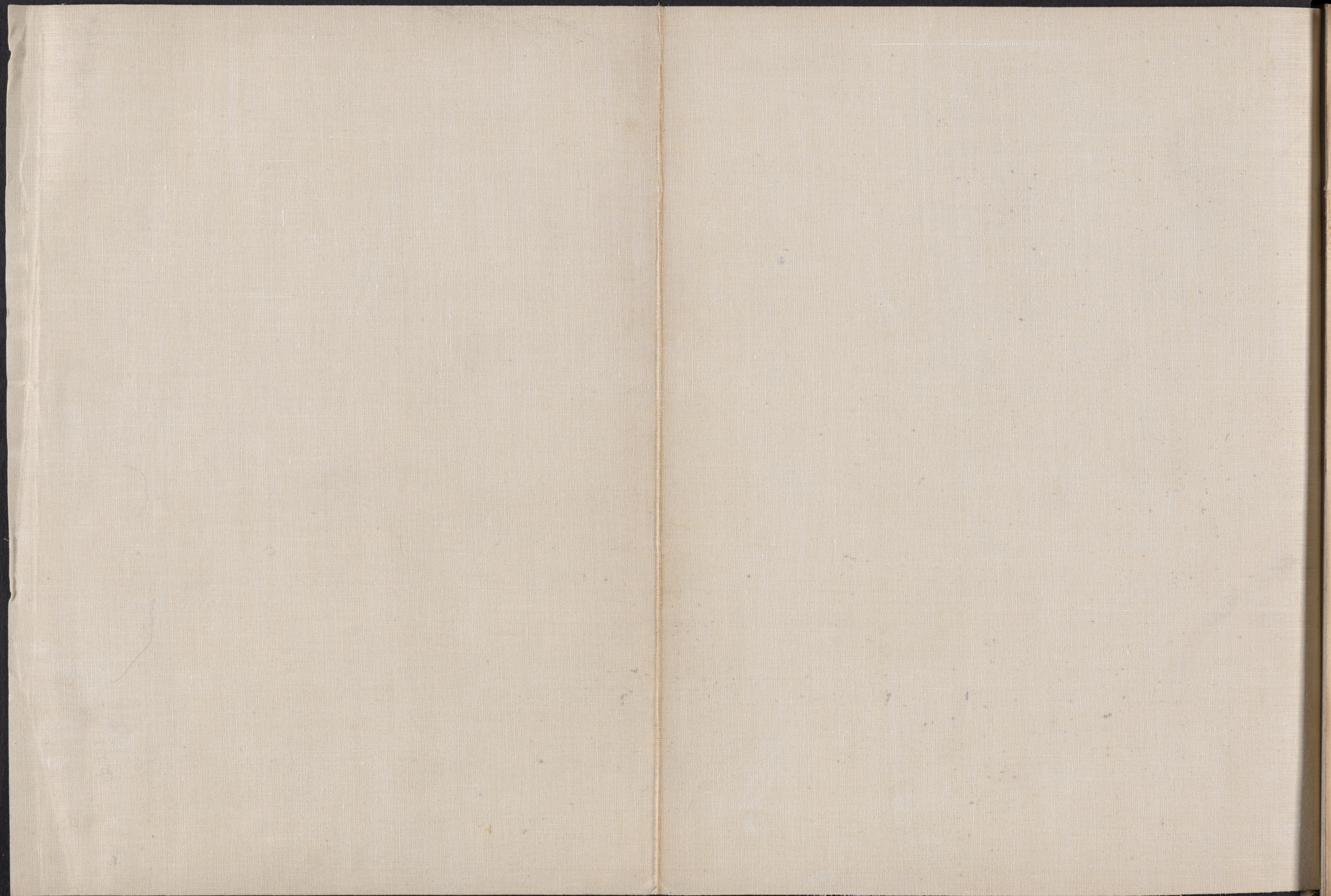


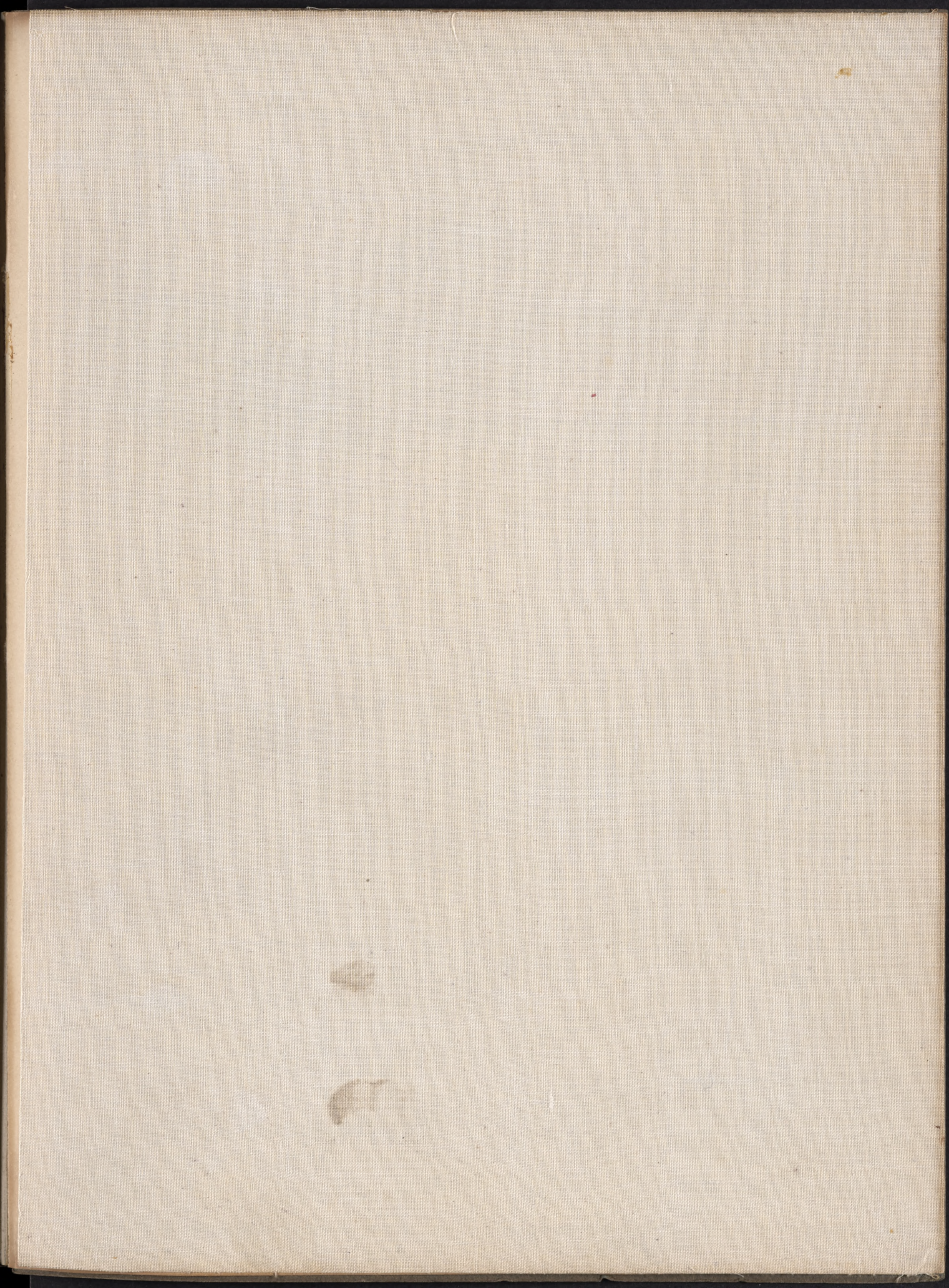


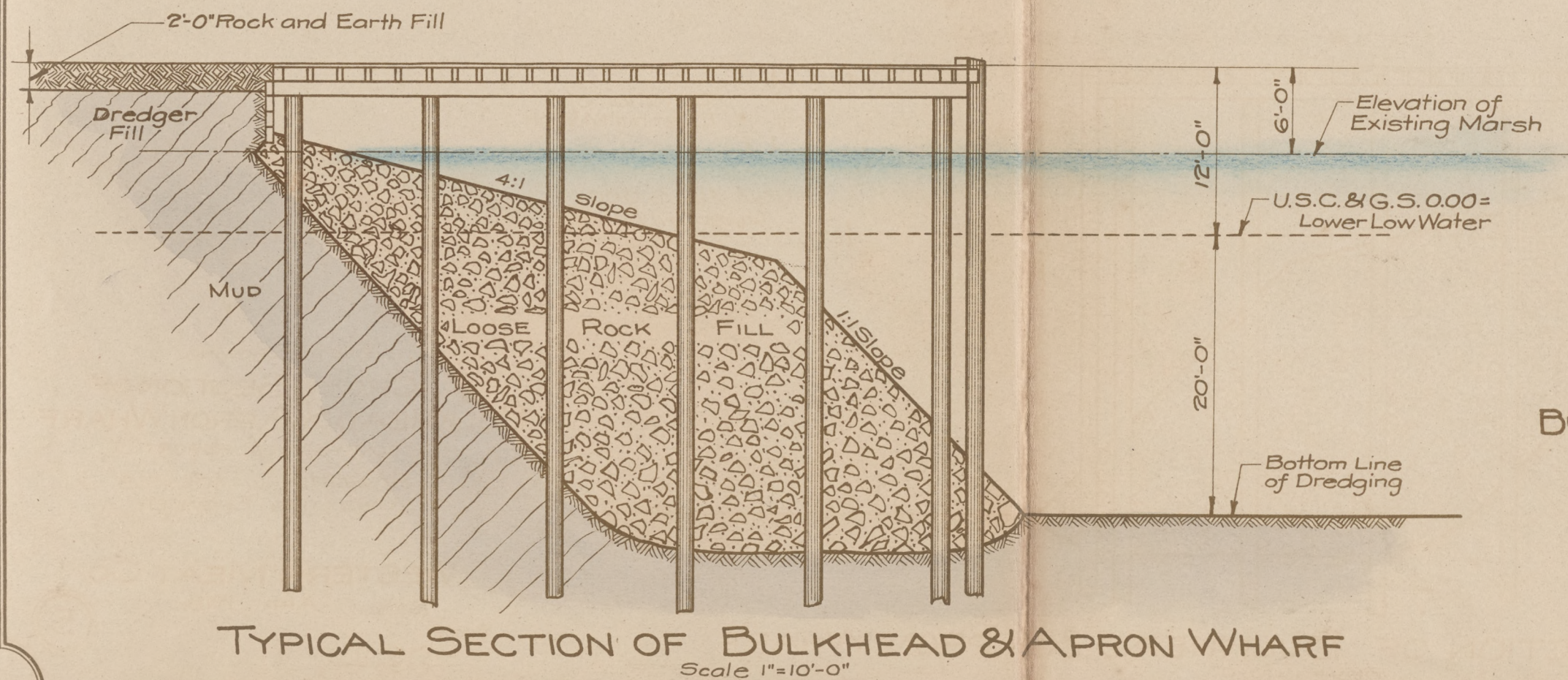
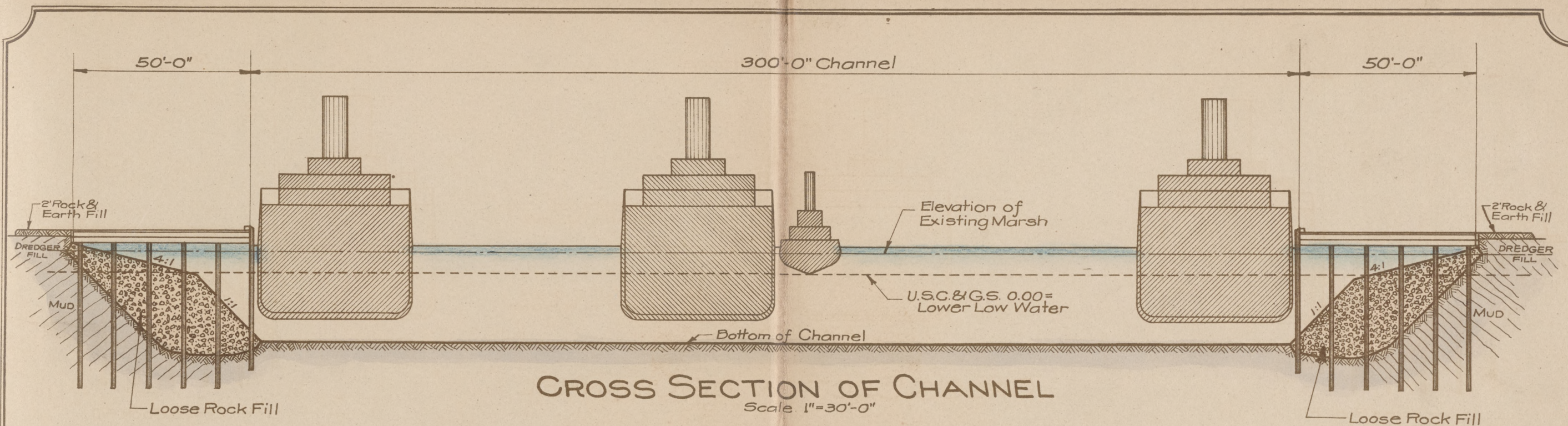


SKETCH SHOWING
DIKE OR MUD FENCE
ACCOMPANYING REPORT OF
HOWARD C. HOLMES
CONSULTING ENGINEER
TO
WESTERN MEAT CO.
APRIL 1918

Scale:
3/16" = 1'-0"
1" = 20'-0"







SKETCH SHOWING
**CROSS SECTION OF
 BULKHEAD & APRON WHARF**
 ACCOMPANYING REPORT OF
 HOWARD C. HOLMES
 CONSULTING ENGINEER
 TO
WESTERN MEAT CO.
 APRIL 1918.

Scale:
 1"=10'-0"
 1"=30'-0"

